



US005733062A

United States Patent [19]

Oberth et al.

[11] Patent Number: 5,733,062

[45] Date of Patent: Mar. 31, 1998

[54] HIGHWAY CRASH CUSHION AND
COMPONENTS THEREOF

[75] Inventors: Michael H. Oberth, Lincoln; John V.
Machado, Antelope, both of Calif.

[73] Assignee: Energy Absorption Systems, Inc.
Chicago, Ill.

[21] Appl No.: 558,109

[22] Filed: Nov. 13, 1995

[51] Int. Cl. 6 E01F 15/00

[52] U.S. Cl. 4046; 256/13.1

[58] Field of Search 404/6, 9, 10; 256/1,
256/13.1; 104/15, 105

[56] References Cited

U.S. PATENT DOCUMENTS

3,674,115	7/1972	Young et al.
3,845,936	11/1974	Boedecker, Jr.
3,944,187	3/1976	Walker.
3,982,734	9/1976	Walker.
4,321,989	3/1982	Meinzer.
4,452,431	6/1984	Stephens et al.
4,460,161	7/1984	Grenza.
4,583,716	4/1986	Stephens et al.
4,607,824	8/1986	Krage et al.
4,674,911	6/1987	Gertz.
4,681,302	7/1987	Thompson.
4,909,661	3/1990	Ivey.

5,022,782	6/1991	Gertz et al.
5,054,954	10/1991	Cobb et al.
5,112,028	5/1992	Lattner.
5,217,318	6/1993	Peppel.
5,286,137	2/1994	Cincinnati et al.
5,547,310	8/1996	Muller

404/9 X

FOREIGN PATENT DOCUMENTS

0 286 782	10/1988	European Pat. Off.
0 389 081	9/1990	European Pat. Off.
3702794A	8/1988	Germany.
3708861A	10/1988	Germany.
3813706A	11/1989	Germany.
1342964	7/1986	U.S.S.R.
WO 93/00480	1/1993	WIPO .

Primary Examiner—James Lischora

Attorney, Agent, or Firm—Brinks Hofer Gilson & Lione

[57] ABSTRACT

A highway crash cushion includes a single, central, rigid, guide rail that guides the crash cushion in axial collapse. Diaphragm assemblies are each provided with recessed legs, and a central guide that slides along the rail while locking against the rail in a lateral collision. The diaphragm assemblies support fender panels that include four longitudinally extending ridges, a central slot, and a tapered trailing edge that reduces vehicle snagging. Energy absorbing elements are disposed between the diaphragm assemblies, and each includes an indicator that clearly indicates when the element has been compressed and possibly damaged.

17 Claims, 5 Drawing Sheets

